



US010135268B1

(12) **United States Patent**
Gokcebay

(10) **Patent No.:** **US 10,135,268 B1**

(45) **Date of Patent:** **Nov. 20, 2018**

(54) **LOCKERS WITH CHARGING POWER**

(56) **References Cited**

(71) Applicant: **Digilock Asia Ltd.**, Kowloon (HK)
(72) Inventor: **Asil T. Gokcebay**, Petaluma, CA (US)
(73) Assignee: **Digilock Asia Ltd.**, Kowloon (HK)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

U.S. PATENT DOCUMENTS

7,189,107	B1 *	3/2007	Strayer	.....	H01R 13/72
					439/501
7,800,914	B2 *	9/2010	Dully	.....	G06F 1/1632
					361/756
8,456,819	B1 *	6/2013	Smith	.....	A47B 96/00
					312/223.1
9,368,924	B2 *	6/2016	Byrne	.....	H01R 13/73
2009/0267564	A1 *	10/2009	Gerber	.....	H02J 7/0027
					320/114
2010/0176762	A1 *	7/2010	Daymude	.....	H02J 7/0044
					320/115
2012/0078413	A1 *	3/2012	Baker, Jr.	.....	G07F 17/12
					700/232
2014/0175031	A1 *	6/2014	Roberts	.....	H02J 7/0027
					211/26.2
2015/0084590	A1 *	3/2015	Pearlman	.....	H02J 7/0027
					320/111
2016/0165443	A1 *	6/2016	Baldasare	.....	H04W 12/06
					455/411

(21) Appl. No.: **15/071,129**

(22) Filed: **Mar. 15, 2016**

(51) **Int. Cl.**
H02J 7/00 (2006.01)
H04M 1/04 (2006.01)
H05K 7/14 (2006.01)
H04B 1/3883 (2015.01)
A47B 81/00 (2006.01)
A47B 97/00 (2006.01)

* cited by examiner

Primary Examiner — Dimary Lopez Cruz
(74) *Attorney, Agent, or Firm* — Thomas M. Freiburger

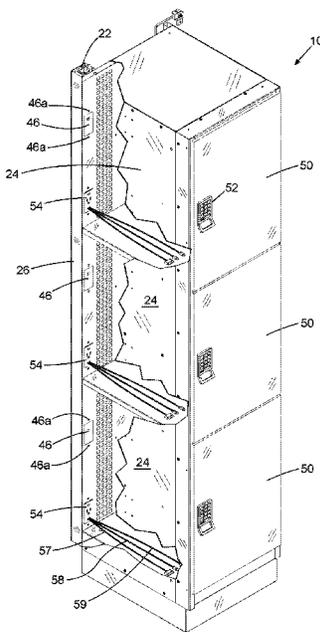
(52) **U.S. Cl.**
CPC **H02J 7/0027** (2013.01); **H04M 1/04** (2013.01); **H05K 7/1449** (2013.01); **A47B 81/00** (2013.01); **A47B 97/00** (2013.01); **H02J 7/00** (2013.01); **H04B 1/3883** (2013.01)

(57) **ABSTRACT**

In a stack or matrix of lockers, typically in two, three or more tiers or rows and in multiple columns, charge power strips are secured at the back sides of the lockers and exposed through openings in the back walls of the lockers so as to provide line power and also low-voltage DC charging power for smartphones and other portable devices, with a plurality of different charge port fittings provided. The power strips are of a length to extend to two or more lockers and preferably are installed vertically, but could be installed horizontally. The lockers have a protected channel at rear, within which the power strip is installed.

(58) **Field of Classification Search**
CPC A47B 81/00; A47B 97/00; H04B 1/3883; H04M 1/04; H02J 7/00; H02J 7/0027; H05K 7/1449
USPC 174/72 A, 70 R, 135; 361/826
See application file for complete search history.

6 Claims, 5 Drawing Sheets



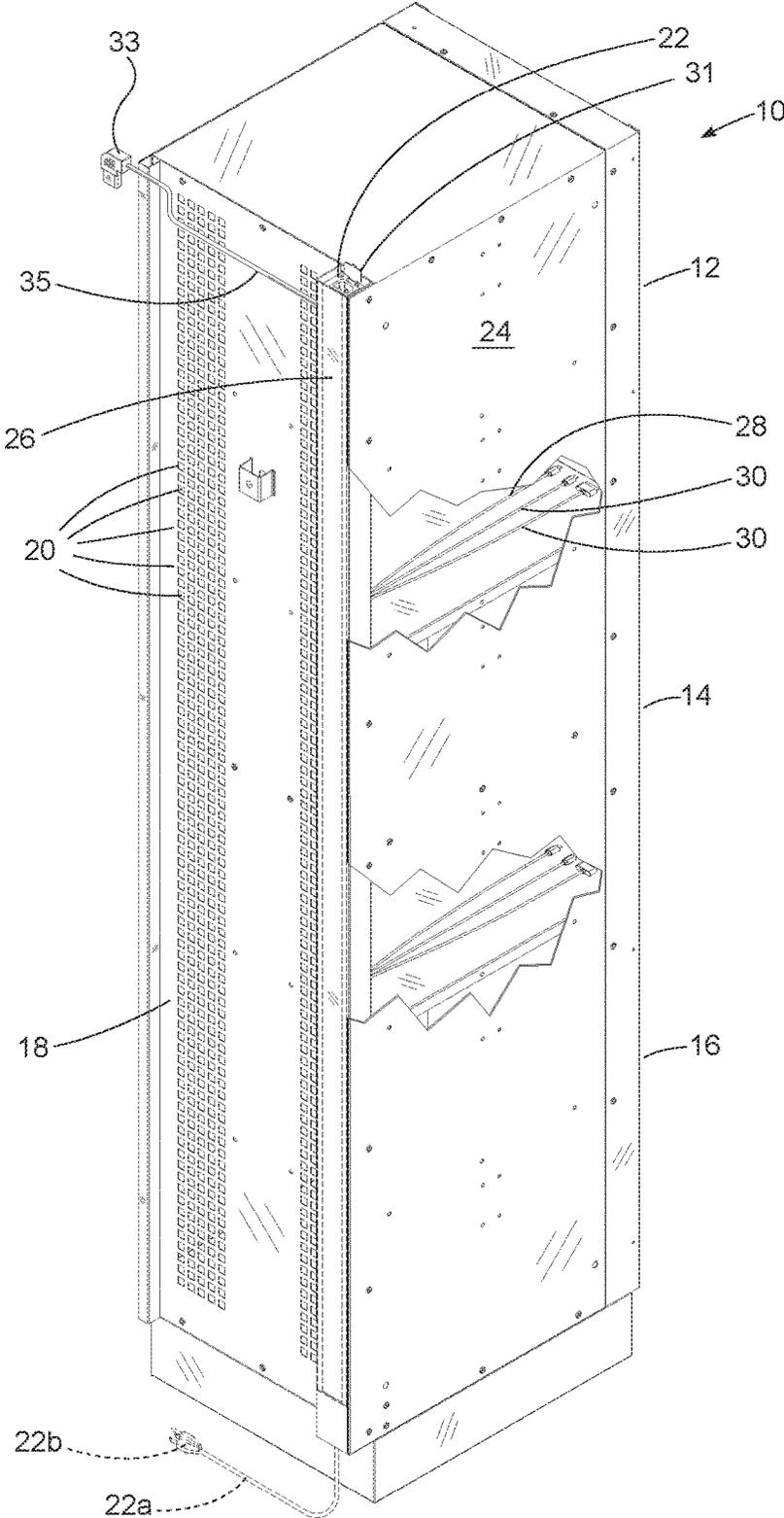


FIG. 1

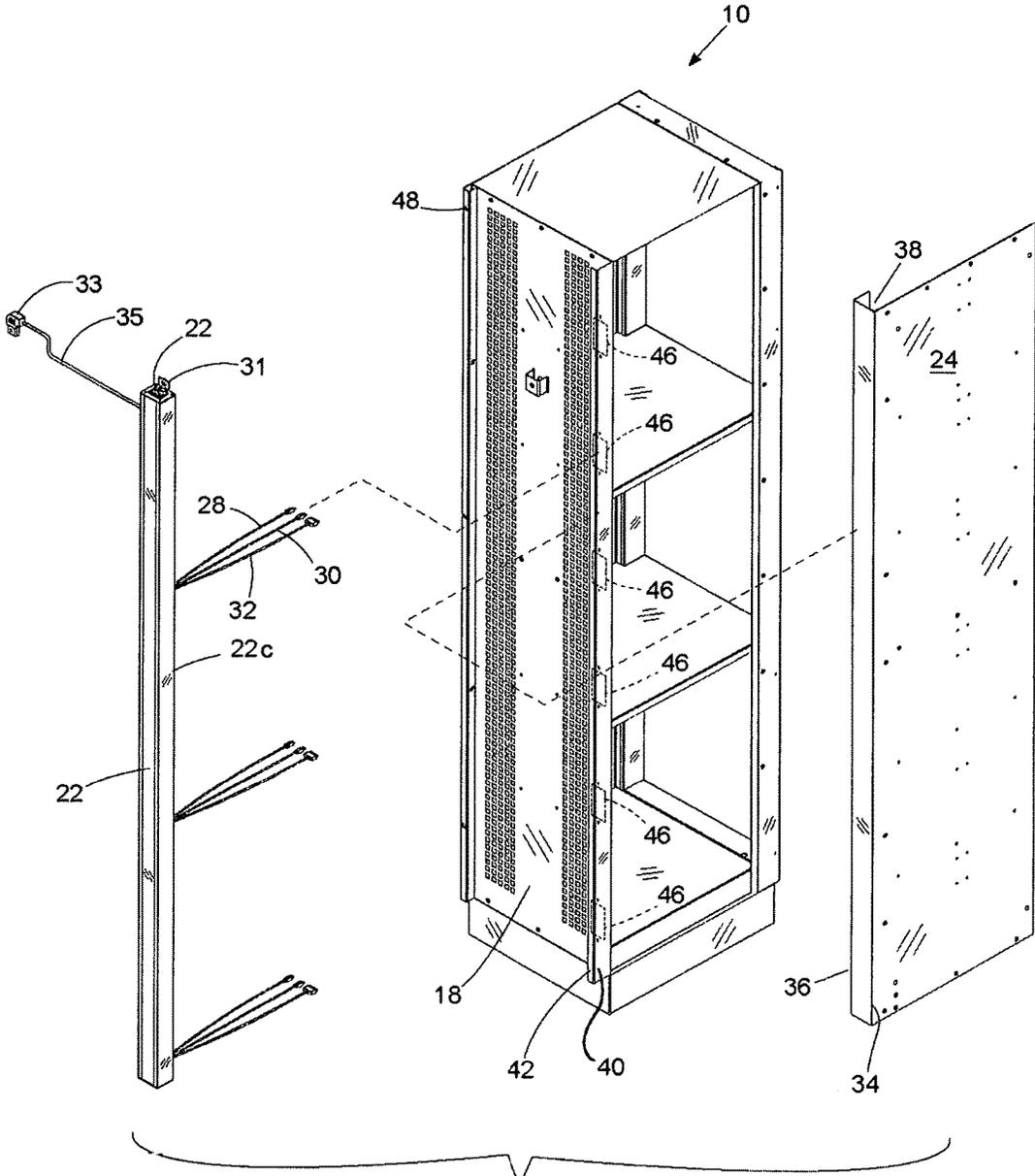


FIG. 2

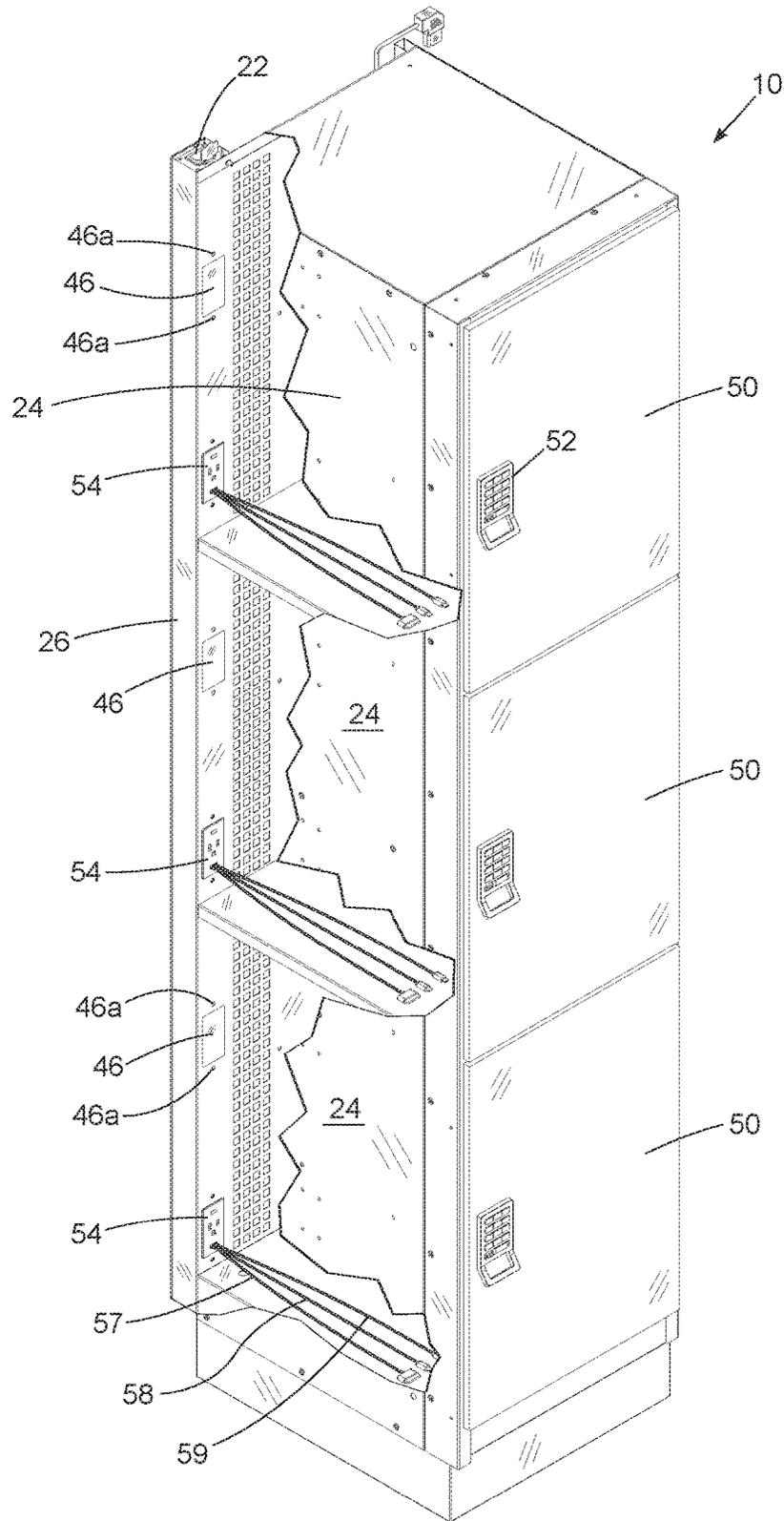
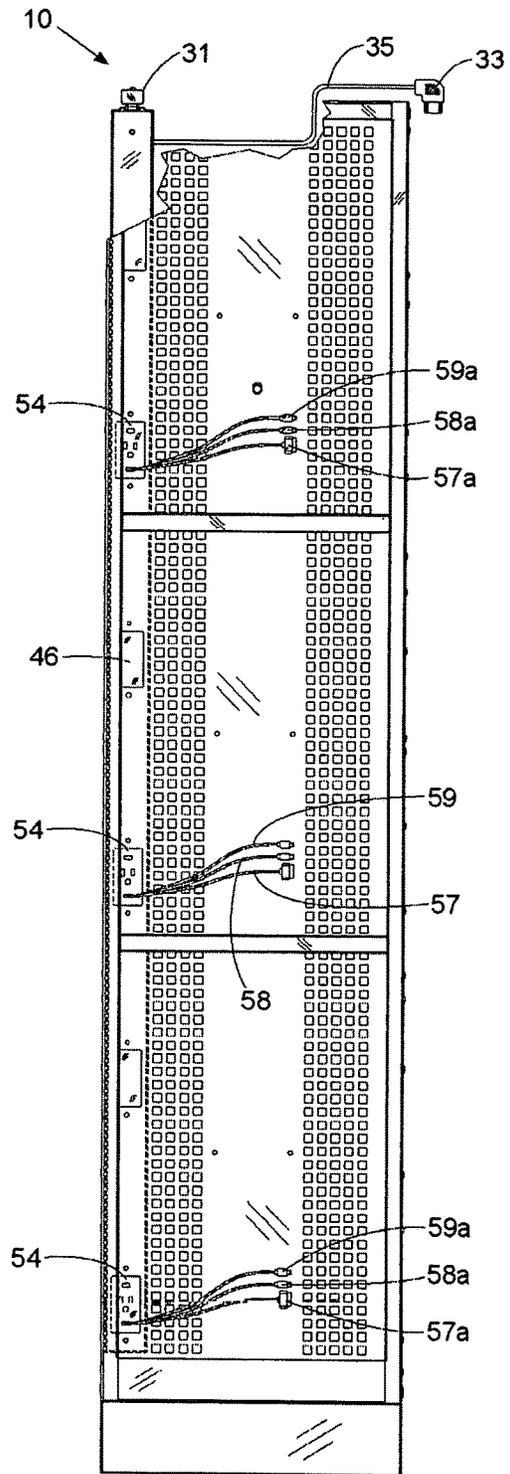
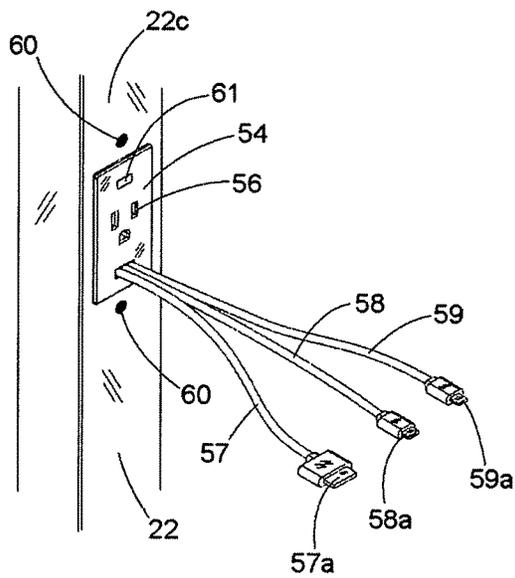
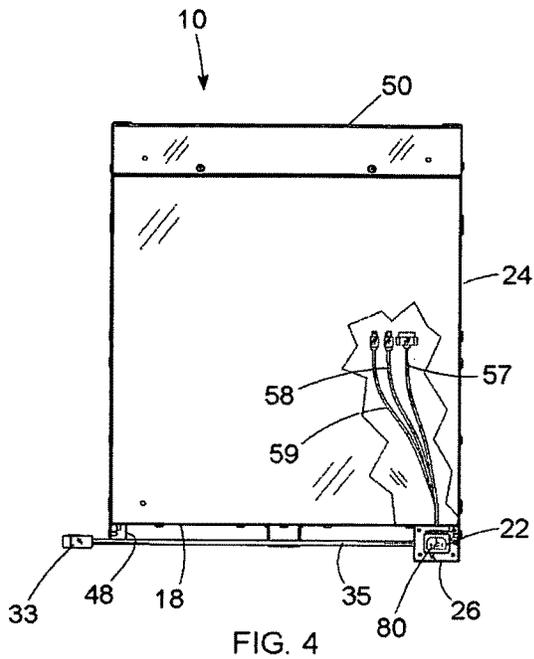


FIG. 3



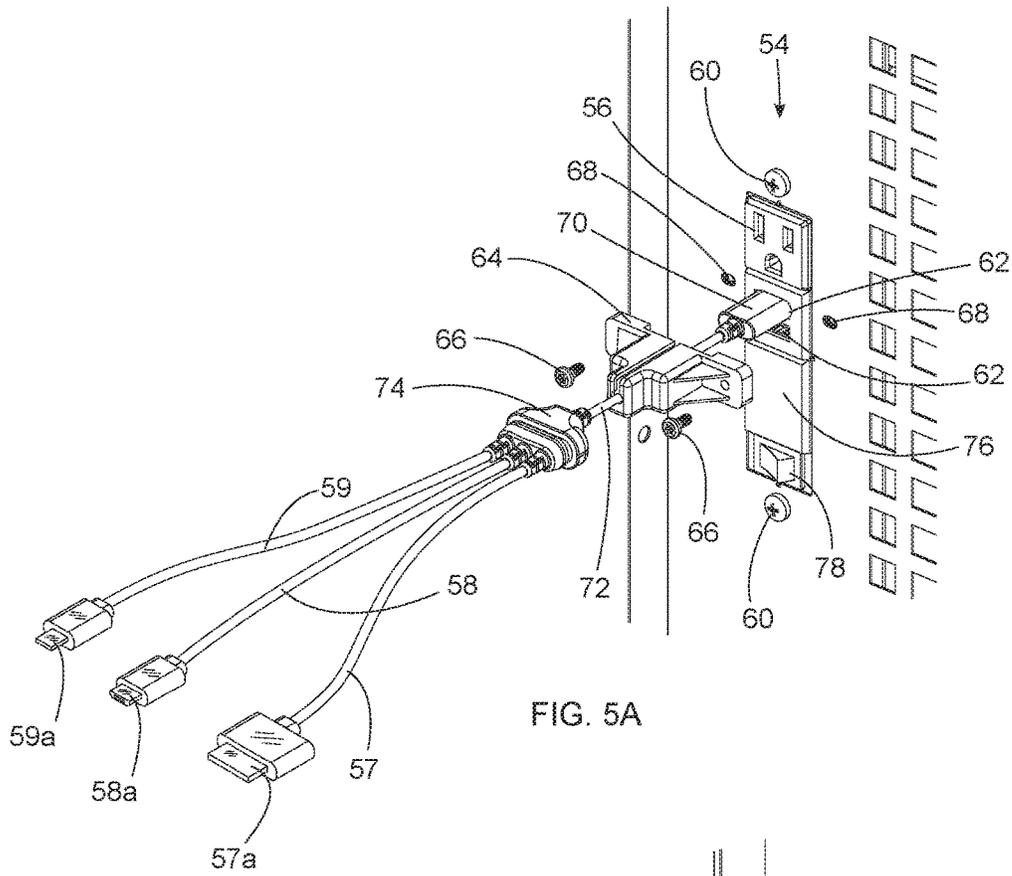


FIG. 5A

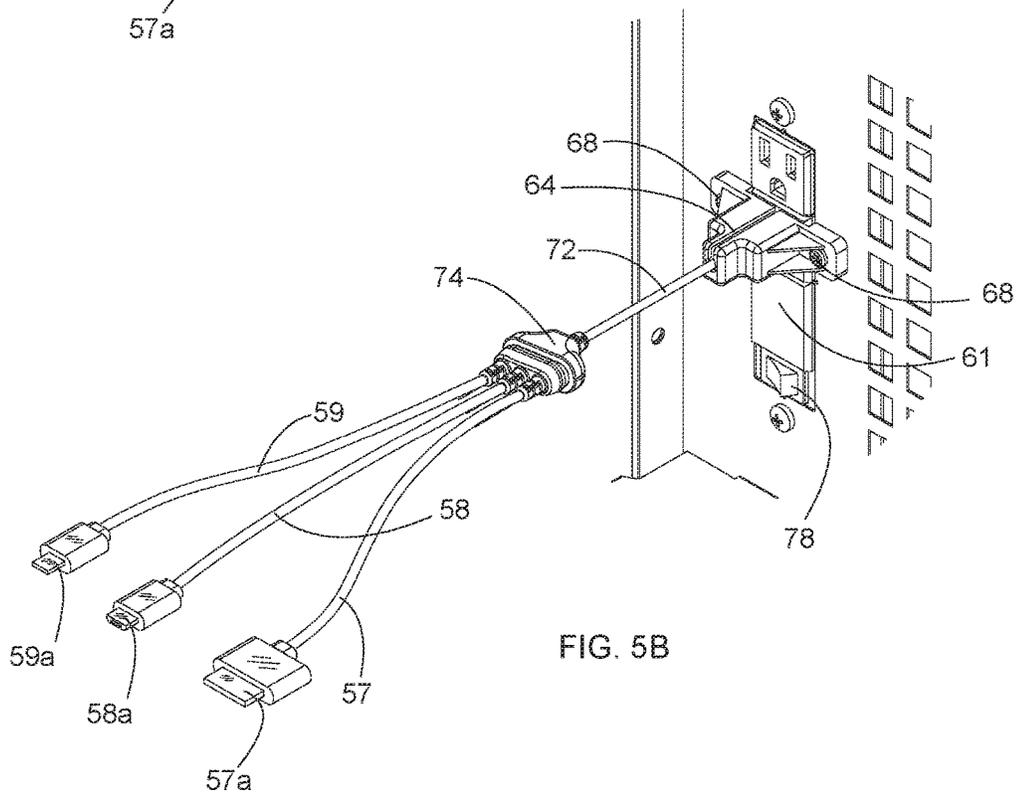


FIG. 5B

LOCKERS WITH CHARGING POWER

BACKGROUND OF THE INVENTION

This invention concerns lockers for storage of users' articles, either long term or short term, and particularly the invention concerns an efficient system providing charging power terminals inside lockers so that computers or small hand-held devices such as smartphones can be charged during use of the locker.

Charging lockers, particularly those for charging mobile phones, have been available at public places such as airports, university campuses and stadiums, and have included cables with end connectors configured for several different charging port protocols. The charging devices have been wired for each locker component and are generally provided for either low voltage charging or line voltage charging or both. In the case of low voltage charging, such as with USB terminals or other terminals with cables for charging mobile phones, the chargers include a power supply with multiple outlets which are wired to each compartment. Since only a few types of cable terminals cover a multitude of cell phones in the market, several different charging cables in the charging locker can handle most phones. This provides great convenience to users of the lockers, who do not always carry their phone chargers with them. In the case where a line voltage is required, particularly with laptop computers that have many different charging port configurations, the line voltage has to be wired with conduits to prevent electrical shock and fire.

Prior to the current invention, there has not been a portable device charging system efficiently built into lockers, particularly a bank of lockers extending in a vertical stack or horizontally or both, in rows or columns.

SUMMARY OF THE INVENTION

The invention provides an efficient system for battery charging to serve laptop computers and smartphones or other hand-held devices in a variety of charging port configurations.

In a stack or matrix of lockers, typically in two, three or more tiers or rows and in multiple columns, charge power strips are secured at the back sides of the lockers and exposed through openings in the back walls of the lockers so as to provide line power and also low-voltage DC charging power for smartphones and other portable devices, with a plurality of different charge port fittings provided. The power strips are of a length to extend to two or more lockers and preferably are installed vertically, but could be installed horizontally. The lockers have a protective channel at rear, within which the power strip is installed.

In a preferred embodiment, a vertical column of lockers, in two, three or more tiers, have the protective channel at left or right of the rear wall of the lockers, with one side of the channel appearing as an extension of the side wall of the column of lockers; the protective channel can actually be integral with the side wall of a column of lockers, formed into an enveloping shape at rear of the locker. Threaded holes are included in the charging power strip to receive machine screws that are inserted through holes in the rear wall of the lockers, securing the charging power strip against the back of the locker structure.

In one preferred embodiment line power is received into the charging power strip at one end, and at the other end is a connection (e.g. a socket) to extend power to another charging power strip in an adjacent line of lockers. Each

charging power strip has an internal transformer or power supply to provide the low-voltage power.

It is thus among the objects of the invention to provide for charging of laptop computers, smartphones or other small portable devices by a convenient modular power strip arrangement whereby a person using a locker can connect charging power to a charging port of one or more devices to charge the device during the period of locker use. These and other objects, advantages and features of the invention will be apparent from the following description of a preferred embodiment, considered along with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a locker unit comprising three stacked lockers, shown from the rear left side and indicating the power stripped charging system of the invention.

FIG. 2 is a perspective view similar to FIG. 1 but exploded so as to show components of the locker unit and charging system.

FIG. 3 is a perspective view from front left, partially cut away so as to show the charging features included in the locker unit.

FIG. 4 is a partially broken away top view.

FIG. 5 is a frontal perspective view showing a portion of a modular power strip of the invention, prior to installation in a locker unit.

FIGS. 5A and 5B are detail views showing an embodiment of the power strip.

FIG. 6 is a frontal view of the three-tier locker unit, with locker doors cut away so as to show the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

In FIG. 1 a locker unit 10 is shown, revealing rear and left sides, the unit 10 having three vertically stacked lockers 12, 14 and 16 stacked in a single unit. At the back side 18 of the locker unit are inner vent holes 20, typically provided for such lockers. Also shown is a charging strip or power strip 22 of the invention, oriented vertically and positioned against the back side 18 of the locker unit, adjacent to the left side 24. The power strip is encased within a protective channel 26 that is formed or assembled to the locker unit. The cut away areas of FIG. 1 show three charging cables 28, 30 and 32 that extend into each of the lockers 12, 14 and 16 from the charging strip 22.

At top of the power strip 22 is a hinged cap 31 that seals closed a line-voltage socket (shown in FIG. 4 at 80) at the upper end of the power strip when the cap is lowered. The cap preferably is spring-biased toward closure. The socket can receive a plug 33 of a cord 35 from a power strip of an adjacent locker unit placed against the side wall 24. If the locker unit 10 is a first tier of lockers of a series of similar tiers, the power strip 22 will include a line power plug-in cable 22a with a plug 22b, shown in dashed lines, as a source of line power for a series of locker units, without any cord 35 and plug 33 at the upper end.

FIG. 2 shows, in exploded format, the charging strip 22 removed from the protective channel 26, indicating it is to be assembled against the back side 18 of the three-tiered locker unit 10 and showing the charging strip can comprise an elongated rectangular housing structure 22c that contains an electric cord 35. The drawing also shows, exploded from the locker unit, the left side wall 24, which in the illustrated

embodiment is formed at two corners **34** and **36** into a channel **38**. The corners **34** and **36** are right-angle bends in the sheet metal that, when the side is attached onto the body of the lock unit **10**, forms the protective channel **26**. In the implementation shown in FIG. 2, the locker body **10** has, optionally as a part of the back side **18**, a flange **40** parallel to the locker's side **24**, with a lip **42** as indicated. The channel **38** formed at the back of the locker unit's side **24** nests with this structure **40**, **42** and provides for securement of the side **24** onto the remainder of the locker unit **10**. Note that the channel **38** will have a slot or similar provision for the electric cord **35** to extend out of the channel at a position below the top of the power strip.

FIG. 2 also indicates openings **46** through the locker's back side, which could be formed as removable knockouts. These openings, preferably rectangular, align with the positions of the charging cables **28**, **30**, **32** at the spaced apart locations along the height of the charging strip **22**. Additional openings or knockouts **46** are shown at an upper level at each locker opening lock unit **10**, in the event the charging cables are to be positioned at the higher level.

FIG. 2 also shows that the locker unit **10**, at the rear right of the unit, preferably has a flange or rolled-over wall structure **48** extending down the height of the unit, and preferably of the same depth as the rear-extending structure **24**, **34**, **40**, **42** at the rear left, serving as stops for positioning the rear of the locker unit **10** against a wall.

FIG. 3 shows the three-tier locker unit **10** in left-front perspective, showing locker doors **50** with electronic locks **52**. The left side **24** of the unit is shown secured in place but cut away in portions at the level of each locker to reveal the power strip **22** as exposed at the inside rear of the locker. A terminal **54** is exposed at the interior of each locker as shown in the drawing. As also shown in FIG. 5, the terminal **54** includes a line voltage outlet **56** and a series of charging cables **57**, **58** and **59**. These cables carry low voltage (generally about five volts DC), and each has a different terminal charging connector **57a**, **58a** and **59a**, to serve nearly all cell phones and other hand-held mobile devices. The line voltage outlet **56** can receive the plug of a charging unit for a laptop computer, for example. The terminal **54** preferably is relieved outwardly about $\frac{1}{16}$ " to $\frac{1}{8}$ " from the front surface **22c** of the charging strip **22**, so as to extend partially or fully through an appropriately positioned opening **46** in the back wall of the locker unit **10**. See FIGS. 3 through 6 showing the charging strip, the terminals and their relationship to the locker unit and individual lockers.

The power strip **22** can be secured to the back side of the locker unit in any appropriate and efficient way, preferably using threaded fasteners. This can be, in a preferred embodiment, via machine screws, the power strip **22** being provided with threaded holes **60**, at least one and preferably two adjacent to each terminal **54**. As shown in FIGS. 3, 5 and 6, the fastener locations in one preferred embodiment are above and below each of the terminals **56**. Thus, the power strip is secured to the back side of the locker using machine screws inserted from the forward side of the locker's rear back wall through holes **46a** provided therein, to engage with the threaded holes **60** on the power strip.

Preferably an LED **61** is included in the terminal **54** to indicate power status, i.e. the LED is illuminated when the terminal is connected to power.

FIGS. 5A and 5B show that the terminal **54**, instead of having the charging cables **57-59** fixedly wired into the power strips, can have a USB socket **62** into which a 3-ended charging cable can be plugged. A second USB port or socket **62** can also be provided for receiving a user's own charging

cable. A device **64** can be included to retain the 3-ended cable from being removed, secured, e.g., by machine screws **66** that engage in threaded holes **68** in the power strip (accessible through holes in the locker rear panel). In FIG. 5A the USB connector **70** for the cables **57-59** is shown plugged in and the security device **64** positioned to be secured against the terminal **54** and the locker rear panel. In FIG. 5B the device **64** has been affixed in place, retaining the USB plug **70** in the socket. A short cable **72** extends to a small hole lock **74** that connects the USB to each of the cables **57-59**. The other USB socket **62** remains uncovered and available. The LED **61** can be replaced with a larger LED light panel **76**, which can be illuminated when the charging power is available, or when in use. Alternatively, or in addition, a switch **78** can be included to turn on the LED light **76** when desired (this can be a momentary switch that turns the light on for a limited time).

Another feature of the invention is the modular aspect in that a power strip **22** can easily be connected to a similar power strip on an adjacent multi-tier locker unit that is positioned directly side-by-side against the locker unit **10**. FIGS. 4 and 6 show, as discussed above, the line voltage cable **35** that extends from one power strip to the next. The plug **33** is indicated as a shielded plug, and can be plugged into a line-voltage socket **80** of an adjacent power strip. The electrical line **35** preferably is simply a flexible cord.

The above described preferred embodiments are intended to illustrate the principles of the invention, but not to limit its scope. Other embodiments and variations to these preferred embodiments will be apparent to those skilled in the art and may be made without departing from the spirit and scope of the invention as defined in the following claims.

I claim:

1. In a bank of lockers for storage of users' articles, including an integral series of lockers stacked vertically within a locker unit structure having exterior walls common to and continuous through the integral series of lockers and with a series of compartments with doors defining the series of lockers within the exterior walls, and the bank of lockers including a series of said locker unit structures positioned side by side, the improvement comprising:

each locker unit structure including at least one modular charging power strip connected to a rear side of the locker unit structure, having a length that extends vertically to the series of lockers, wherein the modular charging power strip provides charging power for smartphones or other portable electronic devices at said series of lockers within each locker unit structure,

the modular charging power strip comprising a linear and elongated housing structure enclosing an electric cord within the housing and having charging terminals at fixed spaced intervals corresponding to spacing between the lockers of the series in each locker unit structure, each charging terminal including a line power socket and a plurality of low-voltage DC power cords extending from the charging terminal with end connectors configured for insertion into at least two different configurations of charging port on the smartphones or other portable electronic devices,

the charging terminals being exposed to locker interiors in the series of lockers by alignment of the charging terminals with holes in the rear side of each locker unit structure, each locker unit structure having a series of said holes, one hole for each locker of the series of lockers, and wherein in each locker unit structure the series of said holes are spaced apart equally to said fixed spaced intervals of the charging terminals, each

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power strip being retained to the rear side of each locker unit structure via fastener holes in the power strip, with machine screws extending from inside each locker of the series of lockers through said rear side and secured into the fastener holes of the power strip, the charging power strip including an external line-voltage plug connected to a cord which extends from said electric cord and a power supply receiving line power and delivering to the charging terminals low-voltage DC power, and the series of side by side locker unit structures being serially connected for line power, each charging power strip having at one end a line-voltage socket and also said cord and line-voltage plug, so that charging power strips obtain power in serial manner from charging power strips at adjacent locker unit structures.

2. The improvement defined in claim 1, wherein each locker unit structure includes a vertical protective channel comprising an elongated channel extending vertically and

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secured at the rear side of each locker unit structure and within which the charging power strip is positioned.

3. The improvement defined in claim 2, wherein each vertical protective channel comprises an elongated three-sided U-shaped metal channel member forming an elongated vertically extending rectangular enclosure against the rear side of each locker unit structure, one side of the channel member positioned as an extension of a side wall of each locker unit structure.

4. The improvement defined in claim 1, wherein the charging terminal further includes an LED to indicate power status.

5. The improvement defined in claim 1, wherein the charging terminal further includes an LED to provide light illuminating an interior space of each said locker of the series of lockers.

6. The improvement defined in claim 1, wherein the charging terminal further includes a USB port to receive a user's own charging cable.

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